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ABSTRACT

This is the first of a four-part study, funded by the National Institute of Education for the purpose of examining the function of informal social networks in school community relations in Pontiac, Michigan, from 1971 to 1981. This volume of the report (1) discusses the theoretical foundations of the study; (2) defends the validity of network analysis as a method for studying the turbulent and complex environment of the school system and the community; (3) explores the issue of trust, both in data collection and in complex social networks; (4) describes the principle of "recipes," regular patterns of action and interaction that can be determined by placing study subjects' statements within the overall social context being examined; and (5) reviews the social science literature on the utility of network analysis, the utility and effects of social networks, and the characteristics that make networks useful. (GC)

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THEORETICAL AND METHODOLOGICAL ISSUES

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UD022 663

Part One of a Four Part Report

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Chapter One

TURBULENCE, COMPLEXITY AND THE FLUID METAPHORS

Our research was initiated in response to a request for proposals issued by the National Institute of Education in 1978 to study informal networks in educational contexts, particularly those related to innovation. The focus of our inquiry is school-community relations in Pontiac, Michigan between 1971-1981. Our goal is to develop a conceptual model based upon field work that will explain how networks function.

Pontiac must be considered a highly turbulent environment. Schools, and all other local institutions, have had to adapt to increasing levels of complexity. This report will describe and analize how complexity increased (Part II: "Sociological View of an All American City"). We will analyze and compare five networks in the community from which we will suggest an interorganizational network that reflects school and community relations at the present moment (Part III: "Network Investigation: Differences and Similarities"). Based upon our study, we will make some statements concerning networks in educational innovation that have policy implications. (Part IV: "Social Networks, Educational Innovation and Change".) However, the central product of our inquiry, as requested in the call for proposals by The National Institute of Education, is to present a conceptual model of how social networks operate. We call this model "The Work of Nets" because we came to it by trying to understand what social networks do in a given social context: what functions networks perform. Our concepts evolved from our field experience in a turbulent environment; from an analysis of network literature

concerning the functions of networks in a variety of situations; and from our own particular interests in the sociology of knowledge.

Although we have divided the report into four distinct sections and have tried to make it possible for each section to be read independently of the others, we point out that the four parts are anchored in the total research experience and all the ideas are interrelated. However, we recognize that different audiences may be interested in one section rather than another. For this reason, we have designed Part I for professional social scientists, especially social network researchers; Part II, for residents and community leaders in Pontiac who have expressed interest in the study. (For this reason, we have removed all technical terms in Part II and presented it on a descriptive analysis. However, in Part III we have translated the content into network terminology.) Part III, is a research report based upon findings in the field and the foundation of our comments in Part I. Part IV is prepared for educational policy makers who look to networks as a possible strategy to facilitate educational change. We believe that such a separation of the report is a realistic assessment of the particular interests of our audience and will make the study more useful.

Locating this Research

> The point is worth repeating: since the adoption of any particular research question implies that concurrent acceptance of a number of assumptions about social networks, and because these assumptions will necessarily interact with the ones associated either implicitly or explicitly with the research design (which includes the analytic techniques), it is necessary to explicate the goals of the research study as completely as possible, and to constantly review all phases of the study from this perspective.
>
> William D. Richards, "A Cognitive-Constructivist Approach to Communication Network Analysis."

The major focus of network research has been the examination of social structure. Networks have been particularly useful in documenting relationships graphically, so that, according to Leinhardt, networks are the means of operationalizing social structure. He explains that this is accomplished by representing structure in terms:

> ". . . of a system of social relations tying distinct social entities to one another. Within this framework the issue of structure in social relations becomes one of pattern of systematic organization." 1977:xiii.

Social network researchers employ a variety of research approaches to the study of social relationships, pursuing different questions and utilizing several disciplines. For example, psychologists and social psychologists have examined personal or ego-centered networks, particularly those related to sociability and friendship, support systems and communication. Sociologists have been successful in using network analyses to examine interlocking directorates, migration and power structures. Organizational researchers have developed interorganizational analyses using network concepts. Anthropologists have used social network as a metaphorical umbrella to organize myriads of detail concerning kinship, work associations and field

interactions. Among all network researchers there has been a growing interest in the content of flows across network channels, as well as a major concern about methodological issues. The latter has become so dominant in the literature that some critics have called network research a method rather than a theoretical orientation.

Our particular research, part of the community studies tradition concerned with the division of labor and its consequences for social organization, reflects the classical theories of Tonnies, Simmel, Durkheim, and the more recent work of Roland Warren, Robert Nisbet, Barry Wellman and Herbert Gans. Network researchers have demonstrated that social ties need not be anchored geographically. They propose a view of community composed of overlapping groups, or semi-groups, connected to each other by multiplex ties, generated through different kinds of relationships. The "web of group affiliations" (Simmel) and "the network city" (Craven/Wellman) are examples of network images of urban society, in which the individual is not an isolated, anomic unit, but a participant in many different forms of association.

A newer tradition in community studies influenced by network research is that of community as an interorganizational arena or field. The organization, rather than the individual, is the unit of investigation.

As Turk (1979) explains:

> "Human life has become organizational life. The actions and interactions of political parties, schools, agencies, churches, revolutionary groups and like are the affairs of cities, nations, and still larger communities--and even constitute their identities. Indeed, the production of community output falters where organizations are not important, few or limited in variety." (3)

Community decision organizations operate within a domain, or social territory, that is supported and bounded by ideological consensus regarding the function of the organization. In this, each organization tries to maintain domain

independence. However, once an interorganizational field is established, there are limits upon subsequent interorganizational behavior. According to Galaskiewicz, (1979) law, tradition, ideology, norms of reciprocity and the sheer complexity of dependency relationships discourage further relational jockeying. By charting interactions between organizations in the field, it is possible to understand how domains structure community life.

We have drawn upon both network traditions in examining school and community relations in Pontiac. We view the school as one organization among many competing within the community field for resources while trying to maintain an autonomous domain. At the same time, we recognize that school personnel and community personnel are linked together in a variety of social relationships, and that the points of intersection among community members, provide the basis for social integration.

There are advantages of using network research to examine school and community relations. Networks deal with the evolution of social structures: they expand, contract and change in response to environmental constraints. Networks also work within an ecological or inter-systems orientation and help us avoid the isolated, internal circumspection that characterizes a good deal of educational research. We also believe that network research may provide a significant breakthrough in understanding complexity, and ultimately, provide a more complete conceptualization of school-community relations.

Characteristics of the Field

> Our present understandings of systematic inquire cannot yet consider unsystematic variation or 'randomness' as the core of substantive meaning of certain choice contexts.
>
> David Wiles, "The Logic of Y=f(X) in the Study of Educational Politics."

Our study was conducted within a turbulent environment, one characterized by a constant state of flux, conflict and uncertainty. A turbulent field has been defined by Terreberry (1968) as one in which:

> ...dynamic processes arise from the field itself and not merely from the interaction of components. The action of component organization and linked sets of them are both persistent and strong enough to induce autonomous processes in the environment.

Turbulence is also characterized by complexity. By complexity, we refer to a condition in which there are many options for action or inaction, each of which influences other actions within a given situation. Another feature of complexity is interdependence: events in one area influence those in other areas in a variety of ways. In contrast to turbulence, a placid environment has minimal disturbances: it is simpler and changes slowly. In a turbulent environment, there is an accelerating rate of change that contributes to the unpredictability, instability and uncertainty in the environment. It is impossible to predict how one action will affect another because there are unintended consequences of decisions. Complexity fosters incoherence and uncertainty by generating confusion. As a result, coping with complexity poses a serious problem for both individuals and organizations.

The qualities of our research field considerably influenced our approach to network analyses. Most network researchers have not worked in a disturbed situation and there are few accounts of the difficulties of operationalizing network procedures under such conditions. Anthropologists are an exception because they have tried to encompass "the full range of human cultural variability" in field situations. (Foster, 1978, 241). Most other social scientists have concentrated more upon social structural questions because established, scientific procedures do not deal effectively with turbulence.

As a result, researchers tend to select institutions and organizations in which roles, norms and activities are well formulated and understood, and the products of change--structures--are more important than the process of change. But conditions in our field site required that we pay attention to turbulence and complexity if we were to operationalize structure.

Furthermore, we were interested in emergent networks as well as more articulated and formal ones. Our focus upon the "work of nets" was an effort to do this. In our view, the promise of social network research lies in capturing the complexity of social relationships, as well as the dynamics of exchange. Because social relations exist simultaneously in many different spheres of activity, and are highly variable and changeable, expanding and contracting so quickly that emergent network structures often are invisible, networks may be identified by what they do in situations.

We framed two questions based on considerations outlined above: (1) What do individuals, organizations, and communities do with networks -- how do they make use of networks? and (2) How do networks effect people, organizations and communities -- or what do networks do to others? Although phrased awkwardly, our goal has been to examine networks from a utilitarian perspective and to view networks in systems from a functional perspective. For example, we wonder how schools, as social organizations, cope with turbulence and complexity. We also wondered how social networks effect behavior of individuals under conditions of turbulence. It gradually became clear to us that our theoretical problem had to include how networks operate in a field characterized by turbulence and complexity. In other words, <u>the qualities of the field itself became important phenomena for investigation.</u>

The Search for Process

> Something is lost when a relation between a pair of living, thinking, feeling persons is reduced to a link that has strength, direction, transitivity, and that fits into one of two or three content categories. Two operations are primarily responsible for this loss--conceptualization and measurement/operationalization.
>
> William D. Richards,
> "A Cognitive-Constructivist Approach to Communication Network Analysis."

A major interest related to turbulence and complexity is social process. The flux of process is change, interaction, negotiation, movement, acting and interpreting. From a process approach, structuring rather than structure per se is the theoretical issue.

According to Mary Douglas (1979), three intellectual developments have stimulated scientific interest in this process: phenomenology, with its emphasis upon the social construction of reality; structuralism, because of its concentration upon the social processes in building knowledge; and ethnomethodology, with its concern for different modes of verification employed in everyday reality. Symbolic interaction theory in sociology has also played a significant role within this discipline by directing attention to a view of man as a symbol making creator. Because turbulence and complexity cause uncertainty, cognitive psychologists have also turned to information processing as a more dynamic approach to decision making. They have examined sequences of operations as these are employed in contingency situations.

However, we found limited interest in process in social network research. Network analyses has become almost synonymous with structural analyses. (Leinhardt, 1979). Process is infered from structure in most studies. There is nothing interhently fixed about the concept of network that

requires a focus upon "static" structure per se. Networks fit comfortably into open systems theory, not only conceptually, but methodologically because advanced computer techniques make it possible to handle masses of quantitative data efficiently. Furthermore, systems operate on many different levels. For example, simple systems such as frameworks (static structure), or clockworks (simple dynamic systems with pre-determined motions) or themostats (in which information is transmitted and interpreted for balance) are closed. In contrast, open systems incorporate turbulence and complexity. At the level of cells, a system is capable of reproduction; plants develop a division of labor; animals respond to images of information; and human beings have a self reflexive quality that enables imaging behavior to exist in time, space and history. At the level of social systems, all of these behaviors are present as well as history, new symbolizations and complex purposes. If we consider such factors, social systems are extraordinarily dynamic.

Moreover, it is not useful to belabor the distinction between structure and process too far. As Luhmann (1980) points out, the distinction fails to grasp "the changeable nature of structures or the structured nature of processes." (10) He argues that the reason sociological theory has inadequately captured the reality of the two is that there is no adequate theory of time.

Nor is the "process problem" caused by formalization per se. As Heckathorn (1979) points out:

> Measurement cannot be blamed for the lack of theoretic richness in the social sciences; what is needed is rich enough theory to encompass what it is noted in the field. The danger for researchers is to assume that because they can measure data, it explains phenomena: the goal of science is explanation and understanding: measurement is a tool in achieving this and not an end in itself.

The emphasis upon structure suggests thoughts of physical phenomena. For example, networks suggest communications as discrete messages sent along designated paths, with little interference or interaction from other messages. This is also suggested by works such as channels, linkages or structural qualities of centrality, density, and range. A process orientation requires a liquid conception of networks; one that emphasizes the second syllable as much as the first and studies relationships that are blown about by circumstances and situations. Instead of channels, we think of canals in which there are discrete paths, but these can be flooded as liquids can spill over banks or seep out. Messages that flow are not discrete, but interact with other currents that come in or branch out from the pathway. We can examine the "circulation" of information and examine the values that stimulate flows or hold them back. A liquid metaphor infuses movement, fluidity, and the merging of experience into our thinking of networks.

Moreover, to use networks metaphorically has advantages that we believe are important in conceptualizing networks. Barry Wellman (1980) describes two types of network researchers: those who wish "to harden network analysis into a method or soften it into a metaphor." Note that Wellman himself uses the metaphor of "hard" and "soft" to convey this distinction. The two approaches to networks also refer to two approaches to scientific research: the first is that of the positivists, and the second, that of phenomenologists. Sometimes the distinction has been expressed in terms of hard and soft data analysis, or quantitative vs. qualitative data analysis. But these dychotomies are not useful.

In 1977 when Leinhardt wrote enthusiastically about networks operationalizing the nation of social structure, he explained:

> The data required for network studies are relational; they are data on what relations obtain between pairs of entities. The entities may be people, or organizations or any other defined social entity. The relations may be any kind of socially meaningful tie. What is of interest to the social scientist is how the relations are arranged, how the behavior of individuals depends on their location in this arrangement, and how the qualities of the individuals influence the arrangement. (xiii)

Social networks, in this view, are conceptualizations of relations: they are not real in the sense of observed experiences. The reality is represented by points with directed arrows illustrating the ties between the points. This abstract and conceptual view of social relations means that network analysis can achieve more precision for analytic purposes, and as a result, network analysis could become more useful scientifically.

However, in 1979, Leinhardt and Holland observed that network mathematics and statistics are "not without cost." They note:

> Indeed, one might well argue that the process of abstracting social behavior so as to permit it to be expressed in terms of network or graph theoretical concepts involves so extreme a reduction in conceptual richness that essential features are lost and, consequently, theory construction and empirical research becomes trivial and irrelevant. (3)

Leinhardt and Holland note that the criteria upon which one may judge the utility of reduction must depend upon the usefulness of such reduction in predicting and explaining behavior. Moreover, they no longer claimed paradigm status for social network analysis stating that "social network research is now simply research on social structure in which a network framework is employed." (5) They identified four areas where they thought an imminent quality breakthrough might occur: time, simultaneous relationships, valued relations and "open ended networks with ill defined boundaries and membership." The last type of network

would be "important in community level research."

We have quoted from Leinhardt and Holland at length to illustrate the rapid changes in network research during the past five years. The study we proposed in June, 1978 and the report we are writing at the end of 1981 also reflect the shifts in our view of network research after working in a turbulent field. Our experiences made us re-examine the utility of fluid metaphors and study the place of metaphorical thinking in social science as a whole.

Is it not possible to utilize the creative and powerful relationships that metaphor brings to our understanding of reality and, on another level in a more limited approach, develop measurement strategies? We might go a step further and argue that without the conscious development of metaphorical analogies, social science in general, and network research in particular, will remain barren. We believe an acceptance of metaphors as a legitimate exercise in scientific thinking will lead to an explanation of our knowledge domains. This view is shared by a growing number of scholars in different disciplines. According to Davidson:

> Metaphor is a legitimate device not only in literature, but in science, philosophy, and the law; it is effective in praise and abuse, prayer and promotion, description and prescription. (1978:32)

He argues that metaphors make us recognize some likeness between two or more things so that metaphors may be judged in terms of the ways that this likeness is useful. In other words, what distinguishes metaphors from ordinary sentences is their effect upon us -- "not meaning but use." Davidson believes that we have confused the two.

Clifford Geertz (1980) notes a growing reproachment with humanities, arguing that in contemporary social science, metaphors are drawn from play

and drama rather than from materials associated with crafts and technology, e.g., propulsive metaphors, like the piston. He writes: "What the lever did for physics, the chess move promises to do for sociology." (1980:168)

A metaphor gives us the ability to conceptualize complex relationships, and this is precisely what the field researcher encounters when embarking upon data collection. For example, we found that the metaphors implicit in "network city" and "interorganizational field" were useful in explaining to cooperative subjects what kinds of information we were seeking. The popularity of the verb "networking" also indicates that the word has meaning for those groups looking for strategies to promote social change. We can observe groups such as feminists, community organizers and educators -- persons with similar ideological orientations -- using "networking" to achieve interaction among non-hierarchial, dispersed social units. It is true that some "networking" is naive with little recognition that the same structural supports used to maintain "old boy" networks can perpetuate "new girl" networks. But "networking" leads to a recognition of the active, dynamic and process oriented dimensions of network structure for many.

Historically, researchers have skirted social networks in a variety of studies and have used the concept metaphorically for considerable periods of time. Eulau (1980) has described the development of the social network metaphor in the Columbia Studies of personal influence. These began as efforts to explain electoral choices. They successfully demonstrated that voting was not an individual act but basically a group phenomena. Moving from this insight, the researchers began to examine questions of personal influence and subsequently, to the communication of influence. Although network terms were used in some of these studies, according to Eulau, the

individual's social network was thought to be "one of direct, face-to-face relations rather than of secondary, tertiary and further connections." (p. 212) By 1954, Berelson and other researchers in this tradition recognized that voting behavior was less a group phenomena than a network phenomena. However, they did not pursue this insight theoretically, although some of the methodological attempts in snowballing (following up respondents' nominations of influential people) were in the network tradition. Eulau believes the failure to recognize the importance of the network metaphor was related to confusing interaction and communication by using opinion leader and influence as the focus of research.

There are two additional network orientations used by network researchers. The first was ecological, developed from Barnes' suggestions that kinship ties in Bremmen (1952) could be thought of as being almost like "fishnets," or from Simmel's classic conception of the "web of affiliation." More recently, researchers use the concept of network in an engineering framework. Although both concepts imply a structure, the latter is far more abstract than the former. It could be, as Germain (1979) has suggested, that the ecological language is closer to people's own experience of everyday processes, whereas the systems are more removed from human beings, and hence more analytical. These are more than trivial distinctions, however, if we recognize that philosophically the two metaphors lead to different paths -- the ecological metaphor towards a conception of structure in which human beings are central and the systems metaphor towards a view in which the systematic dimensions of structure are central.

Viewing networks metaphorically, we could overcome the flatness and -- in our experience -- the arbitrariness, of some of the network questions

found in the literature. Most importantly, it led us to an awareness of the complexity of human relationships. Although network researchers talk about the multi-stranded character of network ties, the reported data analysis seldom includes this. We wanted to examine the depth of the water in our canals rather than simply charting the banks through which most network flows take place. Furthermore, we decided that it was as important to dive into the "deep" as if to chart the paths, and this report is such an effort (even if we may be "all wet!"). Perhaps Wellman (1980) provides the best justification for a more creative approach to networks when he writes:

> The essence of the network approach remains not in its technique but in its posing of questions and searching for answers in terms of structured connectivity. (16)

Summary

It soon became evident that what we had to understand was not the structure of social relationships, but the ways in which social relationships are used to deal with the two characteristics of our field situation; turbulence and complexity. In other words, what do social networks do, if anything, for persons--or stated more actively, how do people use social relationships to do something for them. Thus our question--what is the work of nets--is an effort to understand what networks are by examining the function of networks.

Our emphasis on function was further stimulated by a growing concern with data validity as we initiated data collection.

METHODOLOGICAL CONCERN: VALIDITY

> The validity of network analysis, like that of any other type of analysis, depends on the validity of the data that is used. Network analysis programs such as NEGOPY (Richards and Rice, 1980), are able to provide a great deal of information about systems when they are given valid data to work with. When the data is not valid, they may provide an equally large amount of misinformation. The descriptions provided by these complex computer programs may appear to be plausible when invalid data is used, even to people who are familiar with the system being studied. This plausibility is due to a number of actors, including the surprising ability of human observers to perceive "meaningful" patterns in almost any sufficiently complex situation, together with the fact that there is currently no well-developed theory of what networks ought to look like. It is no wonder that the term "GIGO": (garbage in, garbage out) has been applied to network analysis. On the basis of this reasoning alone, it seems clear that a careful consideration of the measurement process used to obtain data for a network analysis is in order.
>
> William Richards, "A Cognitive-Constructivist Approach to Communication Network Analysis."

We were frequently struck during the field work by the contradictions between what people said and what we observed. This phenomena was first evident during the school desegregation study, when we had several instances in which the observed data simply did not fit into the explanations and interpretations of the events that people presented to us in their accounts.

Moreover, when we operationalized our social networks questions, the contradictions became more glaring rather than less so. Basically, we had three kinds of questions: 1) who talks to whom about what; 2) who do you go to about ... (and we posited a series of concerns); and 3) what person or organization gets things done in Pontiac. The last question was not primarily to determine influence via reputation as much as a way of discovering connections between different networks. One of our first

problems occurred in asking people in 1979 about events in the late sixties and seventies. We found that benchmarks, such as school desegregation, mark events: things are located before or after the benchmark. A second difficulty with our network questions was the degree of self-reflexivity required. Many people simply never thought about who they would go to for a given issue. Some disliked hypothetical questions. Many were reluctant to give us this information because they believed themselves at risk in naming names. Our promises of anonymity were not reassuring. Pontiac is too small for respondents to be protected by psuedoymns. Moreover, some of the information could destroy privleged links that respondents used to obtain resources. In a turbulent environment, protected information is dangerous information to reveal. For example, to name "trusted" whites by blacks and vice versa might in fact, backfire on the individual's names and destroy their credibility within their own group.

One direct effect of turbulence in any complex social system is to raise the level of distrust among participants in the system. As a result, the kinds of reflective questions that we pose in doing network research are often greeted with suspicion and/or apathy. When a community leader is asked to indentify persons perceived to be most influential in public activities, we are asking for information that has the clear potential to be controversial. At the very least, such a question requires the respondent to rank-order persons who may be significant to his or her own position, along some evaluative scale. At best, we are asking far more than perfunctory cooperation and participation in the research process. Although it is almost superfluous to note that the conduct of social research is itself a social process, the problems of a turbulent environment demand that we become more senstitive to this social process initiated by ourselves and how that social

process operates in different research context.

Another factor that added to our concern was the difference in information we received when people called upon us for assistance, as compared to that which we received in asking our network questions. Part of the dilemna that we faced in Pontiac was that we were "known" in the community: we had access to networks in which our position as researchers was known. A key advantage that developed from our local roots was that this gave us entre into many groups. The disadvantage of being known are also clear. The problem of maintaining objectivity in the field has been written about extensively in the anthropological literature.

But, another problem was that of reciprocity. Since we were known, there were several occasions when we were called upon to assist in community studies and participate in local activities. On those occasions, the kinds of information we received differed considerably from the information obtained in interviews. For example, when we undertook a study of voting in the school district, those supporting the effort were very specific in naming people who would be interested in the findings, telling us how to go about getting a sample, and who would be upset by our efforts. On another occasion, we did an evaluation study of a community program. To develop the study, we were given the names of all the organizations in the community and the persons in those organizations who had some influence on the program. In an earlier interview we had been told that this information was privleged.

A third concern, well documented in network literature, was the problem of locating network boundaries. If networks are useful in understanding society because they are more unstructured and informal than groups or organizations or other units with clearly defined boundaries, it is difficult to know how to begin to select a network for study, or determine when the

study is complete. There are two solutions to this problem. The first is to sample networks in a given population and compare the characteristics of these through formal anlaysis. Most of the published network research in the last five years has utilized such sampling. A second approach is to study a particular unit or organizational group -- and examine the networks within the boundaries of the formal unit. But since we were interested in conducting a community study and looking at networks in an interorganizational field, neither solution was useful. We wanted respondents to give us the actual names of people, since it was not useful to refer to our subjects in terms of roles or relationships (sister, friend, co-worker). In the end we resolved the problem arbitrarily -- as have most researchers in a similar field setting. We selected an organization (a sorority) and looked for internal networks; a coalition, internal cliques, and organizations constrained within a loosely defined field we called community. But we remain uncomfortable with this approach to boundaries, as have been other network researchers.

Finally, we were puzzled by frequent omissions of important information given to us by respondents in the unstructured questions. For example, few people indicated that the problems of the city had any relationship to poverty; few identified General Motors as a critical community actor. In listing influential persons, respondents often omitted some obvious names. Puzzled by this, we tested our student interviewers and found a strong bias in favor of reporting persons with whom one had recent contact while overlooking those out of the range of vision. The agenda-setting power of newspapers, for example, also distorted answers.

Research Saturation

There is another important consideration about Pontiac that is relevant to this discussion. Given the proximity of four research universities, e.g., Michigan State University, The University of Michigan, Wayne State University, and Oakland University; Pontiac's demographic eligibility for government programs and the pressure on public school teachers to obtain advanced degrees, Pontiac has become one of the most "studied" sites in the United States. We found nineteen doctoral dissertations and masters theses dealing with Pontiac, several comprehensive federally-funded studies of Pontiac sponsored by agencies from HUD to the National Institute of Mental Health, cores of evaluation reports on social programs in Pontiac, and a plethora of other materials describing various aspects of the community. No one, as far as we know, had tried to bring the local materials together; and persons involved in one study were usually unaware of previous studies or related work.

The availability of materials was both a blessing and a nightmare. On the negative side, residents of Pontiac had simply become tired of being studied. They believed they have been badly used by others for personal gain and that research accomplishes nothing. They were especially troubled by the numerous needs assessments during conducted by social agencies and local governments. From the subject's viewpoint, these led to few visible improvements. Respondents who had cooperated in previous projects generally thought of all research as largely wasted effort since nothing seemed to be done with the information obtained.

Pontiac residents are not unique in these experiences with research investigations. As Barnes has noted in his important and thoughtful book, Who Should Know What? Social Science Privacy and Ethics (1979), the

relationships between researchers, sponsors of research, community gatekeepers, and subjects or citizens, have changed considerably during the last decade. Gatekeepers have learned how to protect their groups from researchers. Citizens also have become more aware that under some conditions they may be at risk in giving information. In our own case, negative community attitudes about research considerably raised the cost of each piece of datum we were able to obtain. For example, we spent hours trying to develop a sense of reciprocity by undertaking service activities for persons and groups in the community in hopes of creating trust and confidence. This was especially important since the topics we are interested in are not neutral issues -- e.g., desegregation, race relations, power, and plant closings.

Concern with reciprocity is, of course, not new; and many cases can be found in the anthropological and community study literature. But what seemed unusual to those of us working on the network study was that in the course of developing trust-generating activities with respondents, we gained more reliable network data than by using conventional methods. For example, in our interorganizational network study, we had no problem obtaining information from the United Way or from various human service agencies. But in the private sector, we encountered difficulties. Why, for instance, should General Motors' staff consent to spend time and energy to provide the kinds of data we needed in our interorganizational research -- especially when General Motors happened to be engaged at the time in a large-scale public relations program to diffuse the shock and dismay of moving a plant employing 7,000 workers outside of the city? As a matter of fact, interorganizational studies have tended to concentrate upon social service agencies, in which information is public and available, or have examined

interlocking directorates, where the information is also publicly accessible. Nevertheless, General Motors represented a critical part of our study. It was only when we helped the Pontiac Motor Division Community Relations Director evaluate the work of that department in Pontiac that we obtained essential information. After all, we could not interview the key community leaders with whom the units worked unless we knew who they were and what the Pontiac Motor Division actually did. In addition, we often needed clarification about the answers we received from our interviews and, thus, had justifiable grounds for obtaining more information.

In our initial efforts, personnel in the school district were not particularly cooperative. One reason for their reluctance was the negative publicity that had previously been generated by several other research projects dealing with academic achievement, desegregation and educational innovation. After cooperating with several earlier studies, school personnel discovered the reports distorted in the local media and used against the staff. They believed their cooperation with researchers injured the reputation of the school district. Another concern among some school personnel was a fear that negative research findings and attendant bad publicity could be used politically to defeat school millage requests. In most instances, these concerns were justified.

Fortunately, there were individual exceptions who cooperated fully with us; and we were able to complete the network studies that we had planned. However, some of our more ambitious survey efforts were not successful. In our work with the school district, we also resorted to non-conventional strategies of information gathering. For example, we asked school administrators to sponsor data collection through an inventory of social resources. Employees and close friends of the public schools were asked to

identify community activities in which they participated and key community organizations where they thought they had personal influence. Respondents were also asked to give their views about community problems and to indicate persons perceived to be in positions of leadership in the community. From the district's point of view, the purpose of the inventory was to provide a source of data for developing good publicity accounts of school personnel and also to initiate a long-range program designed to build additional public support for the schools.

Although we found that collecting network data in a turbulent environment was costly, because we had to generate trust, we also realized through a reflexive examination of how we were generating trust, that we were ourselves using networks to complete our projects. We recognized that the network structure that we "knew" existed did not surface through conventional network data collection methods, but rather emerged from the process of "doing" things. The same questions that generated hostility and vague responses in an interview were readily answered when a respondent needed our assistance in a particular project.

The difficulties we experienced in data collection might simply have been dismissed as unique to our particular research site (although we believe they are similar to data collection problems found in any turbulent environment), if it were not for our growing concern over the validity of the data used in conventional network studies regardless of site. Our concerns center upon the three "c's": context, contact, and content. Specifically, the different kinds of information we obtained in the context of researching, as compared to consulting, differed significantly; the quality of our contacts with respondents changed as the situation was defined differently; and the content

of the information changed as reflected by the context and contact.

Even in non-turbulent environments, there are problems relying solely upon the subjects' responses. Naturally, the problems of faulty respondent recall are even more pronounced in turbulent environments. The more controversial the materials, it seemed, the more unreliable the respondents' accounts tended to become. If we add those errors associated with efforts to deliberately mislead or obstruct the collection of information to the problems of faulty recall, changing perceptions of importance, and forgetfulness, we can begin to appreciate the importance of developing more effective mechanisms for evaluating data collection activities. At the very least, network data analysis should incorporate statistical computations for margins of error. At best, network researchers should begin to work together on improving question format and techniques for checking these.

Problems of validity begin at the point of data collection. Because researchers in our field tend to become so preoccupied with problems related to the instability of the instruments and populations to be measured, we often pay too little attention to what it is exactly that we are trying to measure. It is important to address technical difficulties in measurement, but it is even more important that our conceptualizations about the phenomena we are studying be congruent with empirical reality. While various statistical procedures and linguistic analyses have been fruitful in many ways, the gathering of valid field data remains highly problematic. As Noble concluded eight years ago: "The most fundamental difficulties seem to lie in the gathering of field data." (1973:11)

All of us have become most impressed with the phenomenal capacity of computers to handle complex data, and the potential insights about structure generated by recent mathematical formulations of network research have been

exciting. But we are in danger of making our data collection "pro-active" -- dictating the kinds of questions we ask by the kinds of analyses we want. If our questions tend to be shaped by the kinds of analyses we think that we can do rather than the kinds of questions that have to be answered, we seriously compromise scientific development. These dilemmas are vividly evident in the field because the researcher is constantly trying to "make sense" of what is happening at the same time he/she is trying to ask questions.

The Compatibility of Data

Our study has generated a second concern about the usefulness of data collected by different methods of inquiry. We experimented with several techniques of data collection in our different network studies, ranging from a large-scale survey approach to intensive participant observation. The data obtained from the former did not prove useful in pursuing questions generated by the latter. For example, we used materials developed by an extensive University of Michigan "helping network" study that included over one hundred fifty interviews in four neighborhoods in Pontiac during 1975, and follow-up interviews with the same people in 1976. In this (Warren, 1976) people were asked to identify organizations and roles and to link these with specific types of problems. For our purposes, we wanted to know if schools were perceived as integral components of community helping networks and where and how the schools are located in the "paths of helping" that Warren described. After reanalyzing the data, we were forced to conclude that the "level" of network data generated from the survey simply could not fit into network data developed in studies where respondents identify other persons by name. There appears to be a basic qualitative difference between data based upon names of

contacts and data that allow respondents to protect their contacts.

We think our experience is a relatively common one in network research, but the problems of compatability between data generated by fundamentally different techniques are rarely discussed in network research literature. Edel explores this same general concern when he points out that:

> The emergence of a high-level concept or category is a real event in the natural world, and so what is really happening requires not merely logical examination, but a whole phychological, social, and historical picture. The descriptive inquiry maps the career of the concept. The causal-explanatory inquiry offers hypotheses about its rise and the reasons for its spread. The logical-evaluative inquiry is itself a creative development of the concept, in instances where it is not a mere orderly presentation of how the concept has been used; for such an inquiry shows what the meaning of the concept is. This inquiry can be in relation to different theoretical areas and possible applications. (1979:191)

Moreover, the difficulties associated with levels of analyses are partly related to the problems of scale in analysis. Barth suggests our problem is:

> How can anthropologists study and describe large-scale social systems without losing sight of real people and their life situations? How can they represent the complexity of complex societies, yet cast their description in an analytical model which may also serve for their description in an analytical mold which may also serve for simpler societies, thus securing comparisons between such diverse forms? . . . How can they relate the action of a peson and his conception of a finite, ego-centered world to the global realities that actually impinge on him? (1978, 9)

In other words, scale is a property of the context, or system in which encounters or events take place and not the events themselves. Barth calls for creating "discovery procedures" that can trace patterns empirically moving

from event to class. The process of aggregation, he adds, are distinctive objects of observation and description, not speculation or induction (264).

Summary

To summarize the discussion so far: The basic theoretical questions of this research is to determine what, if anything, social networks do in turbulent and complex environments and how they are used by actors and organizations under these conditions. We were attracted to the concept of networks because it seemed to capture the complexity, overlap, and fluidity of social relationships in contemporary society and promised to help us understand the community interorganizational field. When we tried to operationalize the term, however, we discovered that much of the flexibility and complexity of phenomena was lost in making the data fit into a structural paradigm. As a result, we decided to use networks metaphorically and explore the flows that traveled along network canals. Our field experience also raised concerns about validity that made us conclude that methods of handling data have outpaced methods of generating data. A critical issue in social network research remains that of validity.

As we explored the nature of network flows more carefully, we noted that one kind of flow-trust had important consequences in a turbulent environment and was a critical factor in our understanding of the work of nets.

TRUST

> To show trust is to anticipate the future. It is to behave as though the future were certain.
>
> Niklas Luhmann, Trust and Power.

The capacity to deal with complexity is a sociological issue for individuals, organizations and social systems because complexity threatens stability, information overload and uncertainty. As complexity increases, ways to reduce complexity are essential. Luhmann (1980) suggests that language and reflexive self-consciousness reduce complexity because they permit generalization and selectivity. Another method for coping with complexity is trust.

Trust is usually thought of as a psychological quality found in relationships between persons, but Luhmann argues that there is another level of trust; that of systems. Money, for example, is a medium of trust because it communicates fixed expectations at a general level. (Even though we may occasionally worry about banks, we go about our daily lives with reasonable confidence that money can be exchanged for goods.) Other examples of system media that generate trust are truth, as exemplified by specialized authority or expertise (we assume that car mechanic will fix the automobile); and legitimate political power. Power is linked to trust in that it is based on expectations about what will be done whan the office holder is elected, or that the style of decision making will be acceptable enough for the individual to continue to live in a given society.

Familiarity is closely related to trust since they are both complimantary ways of absorbing complexity. Trust is an attitude one learns from experience and then expands to other phenomena. In contrast,

distrust increases complexity: one can never be sure of others, so therefore one must check to confirm information, operate independently, and be on guard. Trust, however, also contains an element of risk because it can be misplaced. Luhmann writes:

> One who hopes simply has confidence dispite uncertainty. Trust reflects contingency. Hope ignores contingency. (24)

How does trust deal with complexity? First, it orders information processing in the system. Since reality is too complex to control, trust substitutes for complexity. It is no longer necessary to absorb all information: only some is relevant and trust enables the selection to be made with relative ease. By trusting another person or a medium that communicates trust, one has the opportunity to act spontaneously and quickly. Again, to use Luhmann's words:

> Instead of arming oneself against the unpredictability of the other person in the full complexity of all possibilities, one can seek to reduce the complexity by concentrating on the creation and maintenance of mutual trust, and engage in more meaningful action in respect of a problem now more narrowly defined. (64)

Through trust, individuals and systems gain time to react; risks are kept under control. Moreover complexity is reduced because it is possible to go beyond available information to generalize expectations of behavior, "it replaces missing information with an internally guaranteed security" (93). Thus, trust also depends on other reduction mechanisms such as language, law and organization, but it cannot be simply reduced to these; if it is not the only foundation of society, it is certainly important in a complex world.

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As described, due to the turbulence in our field we found that the cost of data collection increased because we had to generate trust. Researchers are not automatically welcomed in a turbulent environment; the many different audiences and subjects required to produce data in a complex situation also compound research difficulties. Through reciprocity, familiarity and self-presentation as responsible professional researchers committed to the protection of the site from unnecessary damage, we gradually obtained network data denied to us by adopting traditional research presentation. As explained, there were reasonable reasons for distrust of educational research in the community and our task was to change this attitude to one of trust. We also became aware of how trust was a part of all social negotiations, not only between researchers and subjects, but among subjects themselves.

We gradually recognized that one of the most valuable flows in emergent social networks was trust. It coalesced around all other flows, such as information, money, approval, or social support. Among the din of messages boomed out in urban society, admidst the complexity of hundreds of factors and variables affecting behavior, some were more

salient: some more trusted. When we examined which were most trusted, we found that they were associated with interpersonal ties. In other words, an important "work of nets" was to facilitate the flow of trust. In so doing, nets were able to move between macro and micro worlds: the individual's concerns and interests were filtered out of the larger field of complex phenomena as these concerns flowed through the trust created in networks, particularly emergent networks developed in response to situations in turbulent environments. A closer examination of the functions identified in the literature review confirmed the importance of trust.

What trust suggests, then, is that it is a significant component in network flows. Just as roles, norms, and values structure social relationships -- provide the social cement, so to speak of society -- we think that trust provides the important covering that travels along with other ingredients in network flows under conditions of turbulence and complexity.

Summary: Trust and Networks

> Human thought is consummately social: social in its origins, social in its functions, social in its forms, social in its applications. At base, thinking is a public activity--its natural habitat is the houseyard, the marketplace and the town square.
>
> Clifford Geertz, "Blurred Genres: The Refiguration of Social Thought."

Although complexity and turbulence are related, they are not identical. What we mean by complexity is an increase in the number and people involved in activities; a wide scope of activity; a large number of variables to consider in any situation; and considerable inter-relatedness

and interdependence between phenomena. The rational approach of dealing with complexity is to break large situations into smaller components (the division of labor), establish modes of coordination and control (usually hierarchial) and create some organizational structures to facilitate activity. But this response to complexity is less effective in a turbulent environment because the speed and extent of change requires more rapid reactions. Moreover, there are increased costs associated with every action because of the interrelationships in the field. Action is based upon highly uncertain knowledge. Even systemic feedback may be an unreliable guide to action since the number and variety of factors influencing behavior may confuse and compound each other. In turbulence, it is difficult to grasp the entirety of a phenomena because of the range and pervasiveness of circumstances, as well as the degree of difference among various happenings. Turbulence presents a severe challenge to rationalization and complexity compounds its limitations.

As we continued in the field and recognized the complexity of the situations that we were trying to describe in detail, we gradually recognized that one of the strategies for coping with complexity was to rely on information provided through the social network. Information was given by persons with whom the receiver was familiar. The information could be evaluated on the basis of past experience. Thus, news about the millage vote provided by an administrator who had access to top persons was one type of information compared to news provided by a housewife about her neighbor's reactions. The major feature of trusted information, in many cases, was the race of the individual. But the phenomena was not restricted to just these concerns. We learned that "idle chatter" was

neither idle or simply prattling, but contained the essence of social interaction.

When we examined networks in a turbulent environment we were struck with their dynamic and elusive character. Both of these qualities are functional because they represent social responses to turbulence and complexity. Another important feature of turbulent networks is that the form of exchange is overwhelmingly oral: the flows are communicated by face to face contact. We believe that oral exchanges are also functional because they provide an immediate, direct and personal form of communication which can be trusted. In other words, emergent networks are valued because they facilitate the exchange of trust. Trust, in turn, enables persons and organizations to cope with complexity. A fluid conception of social structure, then, is one composed of network canals in which a variety of goods flow encapsulated by trust. Should the turbulence disturb the flow, or should the flow spill over or move into another canal, the goods that flow along are held together to some degree by the trust that accompanies the flow. Because much of what happens is oral, this flow is almost invisible (one especially hard to observe by traditional modes of inquiry), as well as difficult to analyze. But for the same reasons that the oral nature of trusted flow poses problems to social network researchers, it is effective for participants in the network.

To summarize:

ENVIRONMENTAL PROPERTIES

TURBULENCE — COMPLEXITY

NETWORK FLOWS

ORAL	TRUST
flexible	simplifies
direct	leads to action
immediate	relevant
personal	valued perceptions
simple	influential
Also:	
ambiguous	distorts reality
easily misunderstood	unreflective
often inaccurate	can be misplaced

The Work of Nets

In our view, one of the most important functions of social networks, especially emergent networks, is to conduct trust through the network. This is usually done by oral communications - simple conversations between known persons, informal exchanges and routine discussions. Because this is such an everyday experience and so much a part of taken-for-granted reality, the importance of oral communication in networks may have been underestimated as a critical feature of social structure. Yet, its very omnipresence and flexibility are the reasons why social structures can be flexible; oral flows are not restricted to territory and for this reason, help explain why networks contribute to social cohesion. The availability of oral trust makes it possible for units in the system, whether person or organization, to adapt to turbulence. Our next problem was how to identify trust in network flows. If our assumptions about its importance in covering other networks flows was correct, we needed some empirical evidence that it did this. We found this evidence in an analysis of information that flowed

along network canals, and explored its significance through the concept of recipes.

RECIPES

> Action is social insofar as, by virtue of the subjective meaning attached to it by the acting individual (or individuals), it takes account of the behaviors of others and is thereby orientated in its course.
>
> Max Weber, The Theory of Social and Communication Organization.

Whatever the contents, the exchanges between people have a social character that often is not immediately recognized. It was not evident, for example, when we examined respondent statements about networks. On the other hand, from our observations and knowledge of the field, we found many of the respondent statements only made sense in light of other knowledge. We experienced the same phenomena that Mary Douglas described in her fieldwork. She could only make sense of data by piecing together information from one context to another, finding "a clutter of suppressed information: that backgrounds the state of received knowledge." (1975,3) According to Douglas, information is pushed out of sight for many reasons: because it is dangerous or conflicts with other information, or because it is self-evident. As she explains:

> The logical steps by which other knowledge has to be justified are not required. This kind of information, never being made explicit, furnishes the stable background of which more coherent meanings are based." 3.

Douglas calls this information "implicit." It consists of the "you knows" that punctuate conversations, the taken-for-granted knowledge shared by

speakers and understood by those in the exchange situation.

This phenomena has been described by many social scientists. For example, Becker, Hughes and Geer (1961) used the term perspective to refer to sets of ideas and actions that are coordinated to the ordinary way a person thinks and acts. Edleman refers to cognitive structures that embrace contradictory formulas used to rationalize inconsistent public policies. (1977,11) Berger and Luckman speak about "shared assumptions about reality" to describe this phenomena. (1966) The point is that information does not consist of raw bits flowing independently: as talk flows from person to person it is evaluated to see how well it fits into prevailing assumptions about experience. If it fits well, and is shared by a number of persons along the network, it becomes trusted, and hence, more valuable. Information flowing over a network becomes accepted information because it comes from trustworthy sources, is shared by those whom we can respect or accept. As Douglas explains:

> Linguists and philosophers have long been saying that language limits the possibilities of thought. But language is not an independent variable, nor is thought controlled and formed by it. For both speech and thought are dependent parts of human communication. The control is not in the speech from BUT IN THE SET OF HUMAN RELATIONS WHICH GENERATE THOUGHT AND SPEECH. 1977,176 (capitals added)

Our task was to understand how people and organizations use social networks to cope with environmental conditions. The only data from which we can infer this is conversation. In other words, once we determined networks by the linkages between persons: who talks to whom, and we inquired or observed what flows between points, we were at the end of our data collection activities. Like Douglas, we began to move parts of conversations, interviews, and observations from one context to another in order to make sense of what we were hearing and recording. We tried to make explicit some

of the implicit backgrounding. At length, we developed the analytic concept of recipe to describe succinctly what the flows contained.

Recipes have three components: evaluated information, proscriptions for action, and interpretations of situations. These characteristics reflect the fact that recipes flow among trusted points; they are shared, and they are the basis for actions--the motive. The term recipe implies a cookbook knowledge; given "a" then "b" and "c" to get "d." Recipes are automatic and unexamined and shared with others in a comfortable way. Strangers, for example, may not know recipes well, although specific characteristics about a stranger many encourage inviting him/her to participate in an exchange. For example, we noted a "black" network of middle class blacks that encourages one black middle class person to feel comfortable including "you know" recipe information relatively quickly with another.

Recipes are not network specific: they flow readily into the rushing stream of talk. However, it is possible to identify recipes by lifting out a sample of the flow--a bucket of the liquid, so to speak, and examine the contents. From the statement so extracted, one can infer a recipe based upon the general content of the water. Simply extracting flows is not sufficient: the recipe emerges only when the contents of the pail are set into a broader framework. All that we could assume is that persons in networks share some recipes in common. Thus, a formal organizational network might have common recipes about the purpose of the organization and how it should operate; an informal sorority might have a shared set of recipes about what is worthwhile leisure time, and so forth.

What we discovered when we took a series of statements by subjects and located them within the overall social context, was that we could infer

recipes. The test of the recipe was to be found in the scripts that followed. Without the recipe, the actions made no sense. For example, one respondent described a forthcoming meeting of a community group interested in education. In our discussion, she assumed a share knowledge of past group activities to support millage campaigns; a shared understanding of the power of GM in Pontiac; a common agreement about the importance of education; similar feelings about the value of school desegregation; and a common allegiance to a set of moral values, such as honesty, integrity, and concern about children. All of these were implicit understandings. In the discussion, the respondent explained that if the other members of the group had political motives, she would withdraw her support. The statement standing alone made little sense. However, we could infer a recipe from the statement (and many others) that explained her comments. The recipe was basically that school study groups often have hidden agendas.

Locating recipes by predicting actions in a given situation is after all, what we do in ordinary interaction. When people know each other well, they can almost "guess" what the other would say. We often have heard statements about "well you know what x would say or do," that is what they will tell you, etc. We used this predictive indicator as the criteria for locating recipes, and then for testing how widely they were within a network.

In a sense, recipe knowledge fits very well with the garbage can model in decision making. In this model March and Olsen (1976) argue that there is little connection between problems, solutions and decisions. We believe that recipes, like decisions, do not follow step-by-step from one person to another but rather in a untidy, disjointed and confused way from one to another. Just as there are four streams of problems, solutions, participants, and choice

opportunities in organizational decision making, so there are several flows of recipes, participants, and events in a network that usually do not all come together.

Two characteristics of communications flowing along informal social networks are related to innovation and decision making. First, such communication is oral, and secondly, it is trusted. Although stated simply, the impact of these characteristics are complicated and important.

Oral messages are redundant, simplified, specific, and fused with a host of sensory effects, such as voice tone, delivery styles and timing. Speakers provide many cues that assist in interpreting messages. Because the oral message is usually salient, it produces relevant information. At the same time, oral communication is easily misunderstood. It is generally taken out of a larger context, is distorted from speaker to speaker, and is contaminated with a host of other implicit messages. In contrast, written statements are more fixed and permanent: they are less subject to distortion and redundancy. Formal organizations rely upon written procedures or rules and contracts to develop routine methods of interacting. Written comments are difficult to live with because they do not allow the exceptions, they require frequent reinterpretation; often they are difficult to understand, they do not provide guidance for an unusual case; and result in endless red tape. Oral communications, in contrast, are more responsive and direct.

Trust in an essential component of emergent networks. In practice, the person sending an oral message has an opportunity to frame that message in familiar language by interpreting phenomena and translating it into simpler more personal language. Moreover, if the speaker is known, the receiver can evaluate the information received in light of other characteristics of the

speaker. There are other clues, such as those Goffman calls "footing" or changes in our stance -- both physical posture and oral shifts in tone.

Another characteristic that we utilized to identify recipes was that of redundancy: a trusted recipe is repeated many times. It is used, often unconsciously, in a variety of similar situations. To some degree, then, we can quantitatively document the recipes used. This is limited, however, because we can only obtain some samples of network conversation. The dynamic and negotiated characteristics of interaction that normally occur are difficult to record except through participant observation. Furthermore, the more sensitive and personal the information flowing, the less likely it will be captured on tape when respondents are asked if the researcher can record conversations. We have received permission from respondents to tape conversations and interviews, and we have also recorded formal oral messages, The essence of informal network communication had been closed to us. (The use of taping devices without respondent permission is, in our view, unethical and inappropriate for scientific inquiry.) As a result, we have relied upon field notes, using traditional anthropological techniques, to recall the oral exchanges.

Because trust is related to familiarity, the status of persons, especially in emergent networks, is important. Master status such as race, sex, or occupation effect trust. For example, we note a "black" network in Pontiac open to all blacks by virtue of race and closed to most whites except those who are trusted. Membership is ascriptive, but it is also based upon a shared culture: recognition that, in America, black people continue to experience similar kinds of constraints in white society. A black person may not seek the black network, but can use it if desired.

An example for the field explains the importance of recipes. Respondents frequently told us that they are going to a meeting "to see what was going on." More specifically, they explained that newspaper accounts were not reliable, official documents and reports were not relevant and the little "important" information was to be found in written communication. From their view, the best way to capture reality was to meet someone directly and talk. This led to understanding or seeing.

Although these observations about the nature of oral and trusted communication flows in networks are neither original or profound, they emphasized the importance of network flows. Experiences are reinterpreted and made more familiar in the process of transmission. Oral communications flowing along networks are major features of the social construction of reality and provide the dominant mode of transmitting change or resisting change. In other works, recipes are cognitive devices with social roots.

Recipes are always translations; they interpret reality and become working codes. In addition, recipes are the foundations of ideologies because they fit into basic assumptions that are already in the individual's repertoire. Recipes also provide a form of shorthand -- like the formula, they provided a way of talking that drastically abbreviates materials. In addition, recipes have a highly emotional component; they are believed and trusted; they are objects of faith. Moreover, they are thought to be true because they have worked in the past; and they have successfully led to anticipated outcomes. Therefore, recipes are worth preserving and grant perceptual protection to those who hold them for a long time.

Emergent networks are often slippery structures that do not stay in fixed position long enough for tangible products to be passed from one contact to

another. Moreover, in ordinary social interaction, there is an "ebb and flow," a movement that is expressed through conversations and other forms of communication.

We believe that recipes deal with both turbulence and complexity because they reduce uncertainty by providing trusted information through the network. As a result, uncertainty, emotional overload and confusion become tolerable and manageable. In our view, the analytic unit of recipes makes it possible to link networks, open systems, and network flows, together. According to Luhmann (1980):

> Systems generated and operating through the constitution, experiencing and communication of meaning are particularly flexible, open ended and capable of particularly sophisticated and selective ways. (xi)

Recipes are useful for many reasons. There most obvious function is to sort out material--to shift through information and to provide a code. Another function is that of integrating the group within the network. For example, the recipe is the shared assumption and the agreed upon rules of behavior that can keep the units together. A third function of recipes is to reaffirm the experience of the person; recipes not only make sense out of reality, but also assure him/her that the interpretation of events is worthwhile. Thus, recipes reduce uncertainty. One could almost say that social recipes--like those used in cooking--may be evaluated by their simplicity, predictability, accessibility, and economy.

In addition to these functions, recipes define situations, both past and present. From this, individuals are given the means of dealing with problems inherent in all cultural systems: bewilderment, emotional pain, and moral concerns. (Holzner and Marx, 1980) Although such features of human existence

cannot be removed, the recipes provide ways in which they can be confronted, borne, and to some degree explained.

Talk is never clear and straightforward: it always carries a variety of meaning packages. That is why it is so difficult to interpret. Yet to neglect the flows leaves sterile structural maps in network analyses. Geertz (1980) has explained the problem facing social scientists who try to combine the two major constructs of social science: culture (meaning) and social structure:

> "in order to avoid having to regard ideas, concepts, values and expressive forms either as shadows cast by the organizaton of society upon the hard surfaces of history or as the soul of history whose progress is but the working out of their internal dialect, it has proved necessary to regard them as independent but not self-sufficient forces--as acting and having their impact only within specific social contexts to which they adapt, by which they are stimulated, but upon which they have, to a greater or lesser degree, a determining influence."

He points out that the elusiveness of meaning has made this far more difficult to understand. Yet we believe that if we conceive of network flows across canals, rather than in terms of fixed exchanges that occur at instances in contact points, we are further ahead in grasping the elusiveness, complexity and fluidity of what is happening. Because recipes force us to relate talk to context and networks, we have found them useful, particularly in understanding emergent networks, and in understanding the "work" of nets.

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Chapter Two

THE WORK OF NETS: A REVIEW OF RESEARACH LITERATURE

We began to examine network literature systematically to discover what other researchers had discovered about the work of nets. The range of this literature is extensive and difficult to compare systematically. Instead of developing an elaborate discussion of the literature, we are listing "terse conclusions," or one statement sentences that summarize findings. We are following the lead of Bernier and Yerkey (1979) who suggest such a format for all researchers to simplify comparisions of data, stimulate cross fertilization between different scientific fields, and to develop cogency. Just as we employ key works to retreive data in existing systems, they suggest that we should consider terse conclusions as a way of retreiving and making information more effective.

A useful starting point to examine the work of nets is the 1971 bibliography, Community-Network-Communication, edited by Barry Wellman and Marilyn Whitaker This gives a state-of-the-art assessment through 1971.[2] Some dominant themes listed in the bibliography were the following: (1) the importance of the extended family and particularistic ties contradict Parsons' assertions about the isolated nuclear family[3]; (2) neighboring studies challenge social science literature prominent in the sixties on what Wellman now calls "the community lost theme" or by Maurice Stein on the "eclipse" of community;[4] and (3) there was a popular interest in the shift from urban to suburban residency. A series of sorting-out studies, most notably by Gans and Berger, documented how suburban dwellers created social arrangements based upon similar social characteristcs rather than geographic location.[5] A

powerful disclaimer came from this research: physical planning does not determine social relationships. Rather, physical sites discourage or encourage social factors in a situation.[6] Another research interest, participation in voluntary associations, yielded complex conclusions. For example, length of residence was not related to participation in some cases, but was in others; education and work history appeared to be salient factors most of the time, but there were significant exceptions.[7] Finally, the bibliography documented a growing interest in non-spatial communities and a recognition that communication and transportation technologies had transformed the forms of social interaction.[8]

Three other themes were present but not emphasized in the bibliography. Anderson and Kanter both noted that the transient quality of ties did not affect their usefulness in providing support, even when relationships were short-lived.[9] Secondly, the possibility of studying social structure through network analyses was recognized by only a few scholars.[11] Thirdly, the concept of community as a system of social relationships and communication systems as the heart of urban structures were emphasized. The last theme suggested the strong link between network and structural analysis that dominated network research during the seventies.

Wellman and Whitaker concluded that "the task of overthrowing Louis Wirth has been well accomplished"; that we needed more information on intimate ties and the nature of the formal structure of networks, as well as more understanding of the impact of communication on both community and network.

In examining the literature since 1971, we asked two questions: <u>what is the utility of networks</u>--what do they do, and secondly, <u>what is the effect of networks</u>. Within these two questions we asked a subsidiary question: what is

the utility of networks for science, and what particular network effects have an impact on persons or organizations.

I. What is the utility of network analyses for scientific investigation?

Social network analyses:

1. pose questions and search for answers in terms of structured connectivity. (Wellman, 1980)
2. represent the essential features of structure parsimousily. (Holland/Leinhardt)
3. permit the use of powerful, deductive analytic features of structural mathematics to state and test theory. (Holland/Leinhardt)
4. provide a common language for the exchange of information among various academic disciplines and helping professions. (Ratcliffe)
5. make cummunication structures visible, understandable and a manageable variable. (Rogers and Kincaid)
6. may become a major unifying framework in clinical practice. (Erickson, G.)
7. may serve as an analytical viewpoint. (Erickson, G.)
8. may be a scheme for problem location. (Rogers and Kincaid) (Erickson, B.)
9. may serve as an arena of practice and research. (Erickson)
10. help to focus upon relationships of information exchange as units of anaylses. (Rogers and Kincaid)
11. can be used to investigate the larger social system with which individuals interact. (Tolsdorf)
12. can move systematically between macro and micro levels of social analysis. (Hammer, Anderson)

13. can reflect anthropological interest in reactions process, phenomena, and generative models. (Wolfe)
14. emphasize the structural forms that allocate access to scare resources. (Wellman)
15. explain the behavior of elements by appealing to specific features of the interconnections among elements. (Noble)
16. can be an ideology stressing person to person communication and non-hierarchial exchanges. (Tranet)
17. may be used for the study of social class. (Barnes)
18. may be a means for studying the influence of the environment in the behavior of individuals. (Barnes)
19. can make Simmel's sociology of freedom and constraint more real. (Breiger)
20. make it possible to investigate differences within and between societies systematically. (Poucke)
21. suggest levels of analysis. (Harary and Batell)
22. reflect limitations or constraints on behavior. (Leinhardt)
23. capture classic social concepts in substantive empirical research. (Ratcliffe)
24. have stimulated research in the social antecedents of specific disorders. (Ratcliffe)
25. have stimulated research on the use of lay and professional services. (Ratcliffe)
26. have stimulated research on the development of innovation and preventive intervention. (Wellman, 1981)
27. encourage analysis of support in a broader context. (Wellman, 1981)

28. illustrate strength and symmetry in the availability of different resources. (Wellman, 1981)
29. link interpersonal ties to large scale phenomena. (Wellman)

II. What is the utility of social networks for individuals or organizations?

Networks:

1. provide the mechanism for linking specialized activities and units with each other. (Craven/Wellman)
2. serve as delivery systems to help meet the demands for goods and services in the community. (Galaskiewicz)
3. can be a neighborhood power base for economic and political activities. (Barnes)
4. are active attempts by urbanites to control system resources. (Wellman, 1980)
5. can be a political resource to encourage communication of relevant information. (Rosenbaum)
6. can facilitate mobilization of resources among different individuals. (Rosenbaum)
7. lessen the likelihood of internal division within a community in the face of externally imposed policies. (Rosenbaum)
8. enable one member of a community to gain access to the resources of others. (Rosenbaum)
9. reduce the likelihood of duplication of effort and wasted energy among members. (Rosenbaum)
10. allow less experienced participants to draw upon the insights of more experienced ones. (Rosenbaum)

11. serve as mediating structures for low income and working class communities (Lineberry/Watson)
12. make urban variety a source of strength, not chaos. (Craven/Wellman)
13. may be a means of controlling urban resources. (Wellman, 1981)
14. can be effective for social control. (Sarason)
15. can undermine self esteem and a sense of identity. (Shulman)
16. can withhold resources and information. (Shulman)
17. can uphold deviant values and be disruptive (Shulman)
18 can be a way of reaching for further collaboration without encountering problems of respect or recognition that arise in formal situations. (Darnovsky)
19. can be important in forming decision making coalitions where city government is large and powerful and structurally complex. (Galaskiewicz)
20. can effect the spread of urban values and behavior from urban to rural areas. (Colson/Scudder)
21. can provide a viable institutional base for a community (Glasgow)
22. can be used for upward mobility. (Ostow)
23. can be used to insure control through kin distant ties and reduce the strength of political opposition. (Bodemann)
24. can be used to insure compatibility in work situations. (Graves)
25. can be a mechanism for economic survival. (Lomnitz)
26. can provide urban migrants with information. (Guillemin)
27. can provide urban migrants with access to marginal work positions, housing and friendship. (Guillemin)
28. can provide information for migration. (Coombs)
29. can provide direction to migration. (Katz)

30. can put users in touch with those who can lend household items or facilitate holiday visits and initiate food and lodging. (Osterrich)
31. can be used by successful migrants in different organizational settings. (Howard)
32. can function to give emotional aid, information and material resources. (Dean, Lin, Ensel)
33. can give participants helpful feedback for maintaining sound behavioral practices. (Dean, Lin, Ensel)
34. can reduce the asymetry of roles in professional helping by the mobilization of mutual helping persons. (Shapiro)
35. can provide affection, approval, advice, respect, understanding, money, fondness, empathy, and support when ill. (Kahn, Antonucci, Depner)
36. can exchange knowledge, services, products, personnel and other resources in order to accomplish some common goal. (Attenave)
37. can assist in coordination, client referral, and other interorganizational efforts. (Wigand)
38. can allow participation by marginals and reduce risk. (Steinberg)
39. can reduce duplication, coordinate services and create a better understanding of protective service procedures and options. (Wink, Basing)
40. can transmit rumors, diffusion of innovation, information and classify communication patterns into roles. (Wigand)
41. can assist change by providing a tension between inner and outer forces. (Goodlad)
42. can provide information about new construction opportunities through correspondence with families. (Denton)
43. can bring other scientists into a large network of influence and

communication through ties with productive scientists. (Crane)

44. can reduce risks and make assistance available, thereby making a migration target more attractive. (Coombs)

45. can be instruments of control and manipulation as in interlocking directorates. (Fennema, Schiff)

46. can be channels of communication in interlocking directorates. (Fennema, Schiff)

III. What are the effects of networks on persons and organizations?

Networks:

1. effect diffusion of influences and information. (Granovetter)
2. effect mobility opportunities. (Granovetter)
3. effect community organization. (Granovetter)
4. act as symbolic markers of different levels of consumption (Pickvance)
5. affect status by permitting access to recourses. (Lin/Dean/Ensel/Tausig)
6. assist or restrain access to secondary resources, such as information mutual aid and influence. (Walker)
7. provide mechanisms for linking specialized activities and units. (Craven/Wellman)
8. affect conjugal decision making through participation in extra-family networks. (Lee)
9. affect families through selection, role segregation, marital stability, migration and residential stability. (Lee)
10. influence divorce/custody battle processes through conflicts over support. (Tolsdorf, 1978)
11. are a factor in family cohesion through economic linkages.

(Lomnits/Lizaur)

12. create opportunities for parents to interact with school personnel. (Steinberg)
13. reduce family violence to some degree. (Cazenave/Straus)
14. affect outcomes in serious illness. (Hammer)
15. affect marital staisfaction. (Hurd/Pattison)
16. affect residential location. (Anderson, 1974)
17. affect the way that migrants deal with moving and relocating. (Shulman/Drass)
18. exclude members of an ethnic group from needed resources and act as blocks to upward mobility. (Anderson/Laird)
19. channel newcomers into particular jobs which then become ethnic specializations. (Herman)
20. help realign networks in new environments. (Vasiliadis)
21. are an indiciation of independence and community health. (Warren)
22. increase the vulnerability of older persons to physical or mental breakdown if supportative ties are deficient. (Pilisuk/Minkler)
23. promote mental health. (Weinberg)
24. reduce motivation to seek professional mental health treatment. (Grosser)
25. affect a range of health conditions as diverse as complications of pregnancy, hearth attacks, recovery from cancer and even overall longevity. (Hammer)
26. are used for survival by less impoverished people. (Norris)
27. arouse, modulate and resolve anxiety. (Pattison, Llamas, Hurd)
28. are a resource for those who know who can do what in networks. (Coxin)
29. promote the regular flow of information. (Friedkin)

30. increase influence among organizations with the largest number of reciprocal relations. (Anderson, R.)
31. meet social needs unmet by proscribed social roles. (Tichy)
32. are an important determinant of an organization's recruitment strategies. (Snow/Zurcher/Ekland-Olsen)

IV. What special characteristics of networks are useful?

1. Power is an attribute of position in network structure. (Cook/Emerson)
2. Networks of durable links are usually close knit and reciprocal. (Shulman)
3. There is a tendency to form direct connections out of indirect ones and to limit the number of direct connections formed or maintained at any given time. (Hammer)
4. Leveling coalitions are used to reduce the power of an individual and are recruited from existing networks. (Thurman)
5. Densely knit, bounded solidarity networks help powerless persons conserve and control existing internal resources but limit the ability of members to acquire external resources. (Wellman)
6. Balance in network development is dependent on both compatibility (tension which holds the network together) and confrontation (compression) which moves network building forward. (Judge)
7. Low densities in large networks may be associated with more structural cohesion than higher densities in small networks. (Friedkin)
8. The major structural condition that governs intergroup relations is the degree of connection. (Blau)
9. Clustering suggests the notion of latent, strained, reinforced and free

social relationships. (Davis)

10. The variety and number of a city's external links have a negative effect on the occurrence of city-wide associations. (Turk/Hanada)
11. The more central the community, the less cohesive the local interorganizational network, the more frequent isolated organizations, the greater number of clusters differentiated by sub-cultural identifications rather then institutional affiliations, the lower cohesion and isolation. (Caulkins)
12. The city's extra local network can predict the activity level of new interorganizational networks. (Turk)
13. A variety of ties and uneven network density provides a structural base for urbanities to deal with contingencies but does not lead to communal solidarity. (Wellman)
14. Kin ties are most active to organize resources but reduce close ties to the communities and connectedness of kin who remain at home. (Ostow)
15. Network centrality can be a better predictor of contacts and activism in the community than personal attributes, technical resources and skills or status and autonomy in personal occupations. (Miller)
16. High density networks reflect stages of life and produce norm enforcing groups. (Cubitt)
17. Loose knit networks are more likely to utilize formal sources of social control and support than tight knit networks. (Horowitz)
18. Health is related to the availability of supportive ties as measured by the number of ties in the network; the frequency of contact; and the differential presence of kin or friend in these support networks. (Wellman)

19. Neurotic and psychotic patients have fewer direct links than non patients. (Wolfe)
20. Stressed persons have more parsimonious networks than someone not under stress. (Flament)
21. Schizophrenics are isolated: their networks are small, and not connected. (Sokolovsky, Cohen, Berger, Geiger)
22. Low energy networks can disseminate information among persons in similar status (e.g., superintendents) but networks for change must be open, made up of persons who are treated as equals and have intense commitment and high energy. (Goodlad)
23. Information going over weak ties (local bridges) is often novel and important to the groups involved but bridges do not guarantee a regular flow of novel and important information. (Friedkin)
24. Weak ties effect the diffusion of innovation, criss-crossing ties affect the peacefulness of social relations, density effects social restraint. (Flap)
25. Poorly connected networks contain schisms and barriers that slow diffusion and channel its paths. (Berry)
26. High density networks are related to life stages. (Truex)
27. Occupational, partisan and affective ties are important in founding organizations. (Lemieux/Fortin)
28. Authority networks show greater change over time than social friendship networks. (Roberts/O'Reilly)
29. All persons (in the sample) can be interconnected by four acquaintances. (Pool/Kocken)
30. Boys formed loose knit teams of competitive players whereas girls form

close knit circles for noncompetitive games of intimate conversational exchange. (Tichy)

31. Close knit networks are more at risk providing support to others that those in loose knit networks because they are most vulnerable to death or disruption. (Hurd/Llama/Mansell)
32. Ties appear most active when they serve to organize resources. (Ostow)
33. Low density networks can provide more support as a crucial mediator between personal values and social competencies, on one hand, and environmental variables on the other. (Hirsch)
34. Network exchanges can be mutually exploitative, mutually considerate, mutually benevolent, mutually hostile, and considerate-benevolent. (Ridley/Avery)
35. Charismatic groups were found to have highly connected, interlocking, reciprocated bonds of positive affect and not disjointed, transitive, multi-level power herarchies. (Bradley)

To summarize some of the thems in the literature review, we can say the following:

Networks hold promise of providing a common scientific language to view social structure. They emphasize communication links among social ties within a larger framework. As a structural metaphor, networks impose order on social relations, and for any given moment of time, permit a researcher to map social relationships. Individuals and organizations can use network associations to mobilize resources, to exchange a variety of goods (information, moral support, assistance), and to understand dependencey relationships. Networks effect people by restraining or facilitating access to others, and hence, to resources. From a systems viewpoint, networks build cohesion out of

variability by connecting units. This cohesive ability suggests that networks are important mechanisms for handling complexity and turbulence.

FOOTNOTES

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